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10/609,487	07/01/2003	Oleg Kiselev	VRT0100US	1730

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EXAMINER	
RUTZ, JARED IAN	
ART UNIT	**PAPER NUMBER**
2187	

DATE MAILED: 01/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/609,487	KISELEV ET AL.	
	Examiner	Art Unit	
	Jared I. Rutz	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-13 as amended on 11/2/2005 are pending in the instant application, claims 14 and 15 having been cancelled by the instant amendment. Of these there are 3 independent claims and 10 dependent claims. Applicant's arguments have been carefully and fully considered, but they are only partially persuasive. Accordingly, this action is made **FINAL**.

Claim Rejections - 35 USC § 112

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. The amendments to **Claims 10 and 13** are sufficient to overcome the rejection of these claims under 35 USC 112 second paragraph. Accordingly this rejection has been withdrawn.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-13** are rejected under 35 U.S.C. 102(e) as being anticipated by Talagala et al (US 2003/0167439).

6. **Claim 1** is taught by Talagala as:

a. In a RAID data storage system comprising a stripe, wherein the stripe comprises stripe units B_1-B_{max}. See figure 2 which shows the striping of data across multiple disks.

b. A method comprising receiving a request to read data from stripe unit B_x, wherein B_x is one of stripe units B_1-B_{max}, wherein the request is received from a computer system in data communication with the RAID data storage system. See paragraph 0035 lines 3-6.

c. Reading stripe parity P corresponding to stripe units B_1-B_{max} in response to receiving the request. Paragraph 0037, which shows the reading of all the checksums relating to a stripe, referred to as a vertical relationship.

d. Generating new stripe parity P_{new} corresponding to stripe units B_1-B_{max} as a function of data of each of the stripe units B_1-B_{max}; comparing the new stripe parity P_{new} with the stripe parity P. See paragraph 0037, which show that vertical relationship parity data corresponding to all the stripe units is generated and compared.

7. **Claim 2** is taught by Talagala as:

e. Wherein the RAID data storage system comprises a parity RAID data storage system. See paragraph 0021 lines 1-3.

8. **Claim 3** is taught by Talagala as:

f. Wherein the parity RAID data storage system comprises a RAID 5 data storage system. See paragraph 0021 lines 1-3.

9. **Claim 4** is taught by Talagala as:

g. Returning stripe unit B_x data to the computer system if the stripe parity P compares equally to the new stripe parity P_{new}. See paragraph 0048 lines 6-9, which show that if there is no error in the vertical relationship parity, it is concluded that the stripe unit contains valid data.

10. **Claim 5** is taught by Talagala as:

h. If stripe parity P does not compare equally to new stripe parity P_{new}: reading checksum CS data from memory wherein the checksum CS data corresponds to stripe units B_1-B_{max}. Paragraph 0048 lines 1-6 show that if the initial check of the vertical parity fails the horizontal parity may be checked. From paragraph 0026 of the instant application, it is shown that the checksum data may be parity data.

i. Generating new data for stripe unit B_y, one of the stripe units B_1-B_{max} as a function of checksum CS data and data of stripe units B_1-B_{max} other than stripe unit B_y. There is no limitation in the claim that B_y is not equal to B_x. Paragraph 0049 shows that the data of the block that is read may be reconstructed using the parity data of the RAID array, a form of checksum data.

j. Generating new checksum data CS_{new} as a function of the new data for stripe units B_1-B_{max} as a function of the new data for stripe unit B_y and data of stripe units B_1-B_{max} other than stripe unit B_y. See paragraph 0049 lines 4-5 which

show that new data B_y is compared to the original checksum, in order to do this it is inherent that the checksum value of the new data B_y is generated.

k. Comparing new checksum CS_{new} data with checksum CS data. See paragraph 0049 lines 4-5 which show that the new checksum data is compared to the stored checksum data.

l. Overwriting data of stripe unit B_y with the new data of stripe unit B_y if new checksum CS_{new} data compares equally to checksum CS data. Paragraph 0049 lines 5-9 show that if the CRC generated for the reconstructed data matches the stored CRC it is presumed that the reconstructed data is correct and replaces the old data.

11. **Claim 6** is taught by Talagala as:

m. Further comprising changing the value of variable y and repeating (a)-(d) if new checksum CS_{new} data does not compare equally with checksum CS data. See paragraph 0036 and figures 4a-4e, which show that if a single data integrity error is detected, the other blocks are checked.

12. **Claim 7** is taught by Talagala as:

n. A computer readable medium storing instructions executable by a first computer system in a RAID data storage system, wherein the RAID data system comprises a stripe, wherein the stripe comprises stripe units B_1-B_{max}, wherein the first computer system performs a method in response to executing instructions stored on the computer readable medium, the method comprising: reading a stripe parity P corresponding to stripe units B_1-B_{max} in response to receiving a

request to read data from stripe unit B_x, wherein B_x is one of B_1-B_{max}, wherein the request is received from a second computer system in data communication with the first computer system; generating new stripe parity P_{new} corresponding to stripe units B_1-B_{max} as a function of data of each of the stripe units B_1-B_{max}; comparing the new stripe parity P_{new} with the stripe parity P. Paragraph 0008 shows that the process as taught with respect to claim 1 above may be implemented in software. See also figure 1 which shows the storage system as being separate from the host, thus providing a first and second computer system.

13. **Claim 8** is taught by Talagala as:

o. Wherein the RAID data storage system comprises a parity RAID data storage system. See paragraph 0021 lines 1-3.

14. **Claim 9** is taught by Talagala as:

p. Wherein the parity RAID data storage system comprises a RAID 5 data storage system. See paragraph 0021 lines 1-3.

15. **Claim 10** is taught by Talagala as:

q. Wherein the method further comprises returning stripe unit B_x data to the second computer system if the stripe parity P compares equally to the new stripe parity P_{new}. Paragraph 0049 says that the old data is replaced by the new data. As the data unit was originally read in response to a read request from the host, it is inherent that the repaired data is returned to the host.

16. **Claim 11** is taught by Talagala as:

r. A computer readable medium performing the method described with respect to claim 5 above. Paragraph 0008 shows that the disclosed invention may be implemented in software.

17. **Claim 12** is taught by Talagala as:

s. Further comprises changing the value of variable y and repeating (a)-(d) if new checksum CS_{new} data does not compare equally with checksum CS data. See paragraph 0036 and figures 4a-4e, which show that if a single data integrity error is detected, the other blocks are checked.

18. **Claim 13** is taught by Talagala as:

t. A data processing system comprising: a RAID data storage system comprising a stripe, wherein the stripe comprises stripe units B_1-B_{max}. See figure 2 which shows the striping of data across multiple disks.

u. A first computer system (see figure 1 item 112) for receiving a request to read data from stripe unit B_x wherein B_x is one of B_1-B_{max}, wherein the request is received from a second computer system (figure 1 item 102) in data communication with the first computer system, wherein the first computer system comprises a computer readable medium that stores instructions executable by the first computer system (Paragraph 0008) wherein the first computer system performs a method in response to receiving the request

v. The method comprising reading stripe parity P corresponding to stripe units B_1-B_{max} as a function of data of each of the stripe units B_1-B_{max}. See Paragraph 0037.

w. Generating new stripe parity P_{new} corresponding to stripe units B_1-B_{max} as a function of data of each of the stripe units B_1-B_{max}. See paragraph 0037 lines 4-8.

x. Comparing stripe parity P_{new} with the stripe parity P. See paragraph 0037, which show that vertical relationship parity data corresponding to all the stripe units is generated and compared.

y. Returning stripe unit B_x data to the second computer system if the stripe parity P compares equally to the new stripe parity P_{new}. Paragraph 0049 says that the old data is replaced by the new data. As the data unit was originally read in response to a read request from the host, it is inherent that the repaired data is returned to the host.

Response to Arguments

19. Applicant's arguments filed 11/2/2005 have been fully considered but they are only partially persuasive.

First Point of Argument

20. On page 8 and the first two paragraphs of page 9, Applicant asserts that it is improper to argue that paragraph 0036 lines 7-9 of Holt shows that CRC information is a form of parity bits. The examiner respectfully disagrees. Paragraph 0036 lines 7-9 of Holt reads:

z. *"CRC is an error detection method that uses parity bits generated by polynomial encoding of the data."*

21. Although the invention disclosed by Holt does in fact teach the use of both XOR parity and CRC data, the cited passage from Holt (Paragraph 0036 lines 7-9) clearly teaches that CRC is a form of parity data. CRC differs from XOR parity in the mathematical formula used to generate the parity bits.

Second Point of Argument

22. In the third paragraph of page 9 through the end of the first partial paragraph on page 11, Applicant argues that the cited section of Holt fails to teach or fairly suggest generating new stripe parity P_{new} as a function of data of each of the stripe units B_1-B_{max} as set forth in claim 1. The examiner agrees. Paragraph 0038 of Holt shows that CRC data is generated for the data read from disk and compared to the stored CRC data. Holt does not teach generating CRC data for each of the stripe units and comparing the CRC data for all of the stripe units to the stored CRC data. Accordingly, the rejection of claims 1-5, 7-11, 13 and 15 under 35 USC 102(e) as being anticipated by Holt is withdrawn.

Third Point of Argument

23. In the first full paragraph of page 11, Applicant argues that it is improper to equate the act of reading all checksums as equivalent to the act of reading stripe parity, as there is a clear distinction made between check sum and parity in the claims of the instant application, and because Talagala makes a distinction between check sum and parity data. The examiner respectfully disagrees. Although the claims in the instant

application do make a distinction between stripe parity and checksum data, the stripe parity is not limited to the XOR parity data generated in a RAID system. The first sentence of paragraph 0023 of the instant application reads, "*The first error correction data may take any one of many different forms.*" Paragraph 0023 explains that the parity of each stripe unit is typically calculated by XORing data of the stripe units. The examiner is not aware of anything limiting the stripe parity to XOR of the stripe units. Talagala uses the checksum for each stripe unit to check vertical redundancy relationships. Paragraph 0026 lines 1-8 of Talagala show that the checksum data may be a single parity bit. By checking the checksum of each of the stripe units, Talagala is generating new stripe parity as a function of each of the stripe units and comparing the new stripe parity to the old stripe parity.

Fourth Point of Argument

24. In the first paragraph of page 12 Applicant argues that claim 7 is patentably distinguishable for the same or similar reasons to claim 1. The examiner respectfully disagrees, and directs Applicant to the examiner's response to the Third Point of Argument supra.

Fifth Point of Argument

25. In the third paragraph of page 12 Applicant argues that claim 13 is patentably distinguishable for the same or similar reasons to claim 1. The examiner respectfully disagrees, and directs Applicant to the examiner's response to the Third Point of Argument supra.

Conclusion

26. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared I. Rutz whose telephone number is (571) 272-5535. The examiner can normally be reached on M-F 8:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jared I Rutz
Examiner
Art Unit 2187

jirJIR

Brian R. Peel — Primary Examiner
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12/30/25